

AN ESTIMATE OF THE MIGRATORY TIMING OF SOCKEYE SALMON
INTO UPPER COOK INLET, ALASKA, IN 1992
USING A TEST FISHERY

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ABSTRACT

During the 1992 Upper Cook Inlet, Alaska commercial salmon fishing season a test fishery was used to estimate the timing of the sockeye salmon, *Oncorhynchus nerka*, run as it passed a transect along the southern boundary of the management area. The test fishery operated from 1 July to 30 July and captured 3,105 sockeye salmon representing 2,020 CPUE points. Mean date of the run was 16 July, and the test fishery encompassed approximately 94.7% of the total run.

KEY WORDS: Salmon, *Oncorhynchus*, Upper Cook Inlet, Alaska, test fishery, migratory behavior

INTRODUCTION

In 1979, the Alaska Department of Fish and Game (ADF&G) began a test fishing project near the southern boundary of the Upper Cook Inlet (UCI) salmon management area (Figure 1). The objective of this project was to estimate the total run of sockeye salmon, *Oncorhynchus nerka*, to UCI before salmon reached commercial harvest areas. Such information has helped ADF&G management biologists set commercial fishing times and areas to harvest sockeye salmon surplus to spawning needs. Test fishing results have been reported annually since 1979 (Waltemyer 1983a, 1983b, 1986a, 1986b, Hilsinger and Waltemyer 1987, Hilsinger 1988, Tarbox and Waltemyer 1989, Tarbox, 1990). This report presents the results of the 1992 test fishing project.

METHODS

Test Fishing

Sockeye salmon returning to Upper Cook Inlet were sampled by fishing geographically fixed stations between Anchor Point and Red River Delta (Figure 1). Stations were numbered consecutively from east to west. Station locations were determined from LORAN C coordinates. A chartered test fishing vessel sampled stations 4 - 8 daily. To increase sampling power, an additional station (6.5) was sampled every other day.

Sampling started on 1 July 92 and continued through 30 July. The chartered vessel, *F/V Corrina Kay*, fished 200 fm (366 m) of 2.1 cm (5 1/8 in) multifilament gill net during test fishing. Drift gill net web had a filament size number of 53/S6F, was 45 meshes deep, and was constructed of double knot Super Crystal shade number 1.

All salmon captured were identified to species. All sockeye salmon were measured for length (mid-eye to fork of tail in mm). The number of each species caught at each station was expressed as a catch per unit of effort (CPUE) statistic:

$$\text{CPUE}_s = \frac{100 \text{ fm} \times 60 \text{ min} \times \text{number of fish}}{\text{fm of gear} \times \text{MFT}},$$

where: CPUE_s = CPUE for station s, and
MFT = mean fishing time.

Mean fishing time was calculated as:

$$MFT = \frac{(C - B) + \frac{[B - A] + [D - C]}{2}}{2},$$

where: A = time net deployment started,
B = time net fully deployed,
C = time net retrieval started, and
D = time net fully retrieved.

Once deployed at a station, gill nets were fished 30 min before retrieval started.

Daily CPUE ($CPUE_d$) was calculated as:

$$CPUE_d = \sum_{s=1}^n CPUE_s$$

The following physical and chemical measurements were taken at the start of each set: air temperature, water temperature (at 1 m below the surface), wind velocity and direction, tide stage, water depth, and water clarity. Air and water temperatures were measured using a YSI salinity/temperature meter. Unfortunately, the salinity meter malfunctioned during the project. Wind speed was measured in knots and direction was recorded as 0 (no wind), 1 (north), 2 (northeast), 3 (east), 4 (southeast), 5 (south), 6 (southwest), 7 (west), or 8 (northwest). Tide stage was classed as flood, ebb or slack by observing the movement of the vessel while drifting with the gill net. Water depth was measured in fm using a Simrad echo sounder, and water clarity was measured in m using a 17.5 cm secchi disk.

Describing the Salmon Migration

Catchability, the fraction of the available population taken by a defined unit of fishing effort, was estimated as:

$$q_d = c_d/r_d ,$$

where: q_d = estimated catchability on day d,
 r_d = adjusted cumulative total return on day d, and
 c_d = cumulative CPUE on day d.

Passage rate, the expansion factor used to convert CPUE into estimated numbers of salmon passing the test fishing transect, was calculated as:

$$PR = 1/q_d = \text{passage rate}$$

Since the test fishery did not encompass the entire sockeye salmon run, the total CPUE for the test fishery was estimated after the season using the following relationship:

$$\text{CPUE}_t = \text{CPUE}_f \times \frac{H_t}{H_{(f+2)}},$$

where: CPUE_t = total estimated CPUE for the season,
 CPUE_f = cumulative CPUE through final day, f, of test fishing,
 H_t = total commercial harvest for the season
 $H_{(f+2)}$ = total commercial catch through final day of test fishery
 $(f+2)$, and
2 = number of days it took salmon to travel from test fishery
to commercial harvest areas.

Estimates of CPUE_t and CPUE_d values were used to estimate daily and cumulative proportions of CPUE_t , based on a non-linear model:

$$y_d = 1/(1 + e^{-(a+bd)})$$

where: y_d = cumulative proportion of CPUE or return on day d,
a and b = coefficients of model,
d = day of observation.

To calculate mean date of return, the following formula was used:

$$M = a/b$$

where: M = mean date of return,

RESULTS

A total of 3,105 sockeye salmon, 326 pink salmon, *O. gorbuscha*, 667 chum salmon, *O. keta*, 444 coho salmon, *O. kisutch*, and 3 chinook salmon, *O. tshawytscha*, were captured during the 1992 test fishery (Table 1, Appendices A-D). Daily sockeye salmon catches ranged from 3 to 653 fish (Table 1).

Sockeye salmon daily CPUE values ranged from 2.5 on 7 July to 349.6 on 17 July. Cumulative total CPUE for the duration of the project was 2,020.7 (Table 1). Using post season commercial harvest figures, test fishing spanned approximately 92% of the total run. Therefore, total CPUE for the test fishery would have been 2,186 if test fishing had continued throughout the duration of the run.

Sockeye salmon catches along the transect were similar to the distribution of CPUE values. Approximately 79% of the total sockeye salmon catch and 78% of the total CPUE occurred at stations 5, 6, and 7 (Tables 2 and 3).

Examination of daily and cumulative proportions (estimated post season) of the sockeye salmon run to UCI suggested that only 2% of the run had passed the transect prior to the start of test fishing on 1 July and that the run was 94% completed at project termination (Appendix E; Figure 2). The mean date of the run was 17 July 1992 which was 3 d late relative to the historic average (Table 4).

The total sockeye salmon run to UCI in 1992 was estimated to be 10.8 million fish of which 9.1 million were harvested in the commercial fishery (Table 5). Estimated passage rate for the season was 4,941 sockeye salmon per CPUE index point.

Water temperatures measured along the transect generally increased during the season from a low of 10.0°C early in July to a high of 14.0°C in mid-July (Appendix F). Air temperatures fluctuated between 9°C and 18°C during the project (Appendix F). Wind velocities were generally low to moderate. However, winds of 20 knots or greater were recorded on 3 days (Appendix F). Wind direction was typically from the southeast or northeast.

During the commercial salmon fishing season four estimates of the sockeye salmon total run were made (Table 6). Past studies suggested that the initial best fit estimate was not accurate in predicting total run during the season and that the second or third best fit

estimate was usually more useful. This pattern was not evident in 1992 as the initial best fit estimate (1990 run timing) on 13 July was 10.9 million fish.

DISCUSSION

The objective of the offshore test fish program is to provide UCI management biologists with early total run and timing estimates for sockeye salmon. This information, used with age, sex, size and stock identification data; harvest and escapement data; and observations on fishing patterns combine to formulate a management strategy during the fishing season. It is in this context that the data must be viewed. It has been reported that a bias towards estimating timing to be later than the actual run exist in the program (Tarbox and King 1992). Estimates are therefore generally greater than the actual return early in the season. UCI fishery managers have been aware of this and have used second and third best fit estimates to make their decisions. Therefore, while the 1992 data indicated a run close to 10.8 million fish through 13 and 17 July managers were aware that the second best fit year was estimating 7.8 and 9.0 million fish on these dates, respectively. In 1992, the difference in estimates did not impact formulation of a management strategy. Commercial harvest data and other indicators were also suggesting a large return of Kenai River bound sockeye salmon. The low estimate of 7.8 million fish on 13 July is still a large return to UCI and dictates certain fishing actions.

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Table 1. Summary of sockeye salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1992.

| Date | Number of Stations | Mean Fishing Time (min) | Catch | | CPUE | | Mean Length (mm) |
|--------|--------------------------|----------------------------------|-------|--------|-------|--------|------------------------|
| | | | Daily | Cumul. | Daily | Cumul. | |
| 01-Jul | 6 | 211.5 | 5 | 5 | 4.0 | 4.0 | 513 |
| 02-Jul | 5 | 172.0 | 9 | 14 | 8.5 | 12.5 | 529 |
| 03-Jul | 6 | 213.5 | 6 | 20 | 5.0 | 17.5 | 540 |
| 04-Jul | 5 | 180.5 | 30 | 50 | 24.3 | 41.9 | 556 |
| 05-Jul | 6 | 223.0 | 47 | 97 | 37.4 | 79.3 | 552 |
| 06-Jul | 5 | 181.5 | 26 | 123 | 21.4 | 100.7 | 564 |
| 07-Jul | 6 | 216.5 | 3 | 126 | 2.5 | 103.2 | 603 |
| 08-Jul | 5 | 188.5 | 53 | 179 | 38.7 | 141.9 | 560 |
| 09-Jul | 6 | 226.5 | 103 | 282 | 79.5 | 221.4 | 572 |
| 10-Jul | 5 | 189.5 | 112 | 394 | 81.6 | 303.0 | 573 |
| 11-Jul | 6 | 210.5 | 42 | 436 | 32.8 | 335.8 | 581 |
| 12-Jul | 5 | 194.5 | 76 | 512 | 53.3 | 389.2 | 570 |
| 13-Jul | 6 | 272.5 | 388 | 900 | 224.2 | 613.3 | 571 |
| 14-Jul | 5 | 198.0 | 73 | 973 | 43.8 | 657.1 | 570 |
| 15-Jul | 6 | 266.5 | 371 | 1344 | 236.0 | 893.1 | 575 |
| 16-Jul | 5 | 202.0 | 87 | 1431 | 66.7 | 959.8 | 568 |
| 17-Jul | 6 | 290.0 | 653 | 2084 | 349.6 | 1309.4 | 574 |
| 18-Jul | 5 | 188.0 | 53 | 2137 | 42.1 | 1351.5 | 566 |
| 19-Jul | 6 | 247.0 | 105 | 2242 | 63.7 | 1415.2 | 558 |
| 20-Jul | 4 | 173.0 | 161 | 2403 | 102.7 | 1517.9 | 568 |
| 21-Jul | 6 | 225.0 | 67 | 2470 | 46.2 | 1564.1 | 575 |
| 22-Jul | 3 | 126.0 | 66 | 2536 | 40.2 | 1604.3 | 573 |
| 23-Jul | 6 | 190.5 | 43 | 2579 | 39.9 | 1644.2 | 564 |
| 24-Jul | 5 | 186.5 | 21 | 2600 | 15.8 | 1660.0 | 562 |
| 25-Jul | 6 | 234.0 | 51 | 2651 | 35.1 | 1695.1 | 574 |
| 26-Jul | 5 | 193.5 | 101 | 2752 | 66.5 | 1761.7 | 565 |
| 27-Jul | 6 | 231.0 | 54 | 2806 | 37.6 | 1799.3 | 556 |
| 28-Jul | 5 | 186.0 | 80 | 2886 | 60.5 | 1859.8 | 573 |
| 29-Jul | 6 | 233.0 | 145 | 3031 | 103.9 | 1963.7 | 572 |
| 30-Jul | 5 | 184.0 | 74 | 3105 | 57.0 | 2020.7 | 572 |

Table 2. Estimated sockeye salmon catch by date and station, Upper Cook Inlet offshore test fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|------|------|------|------|-----|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 1 | 0 | 0 | 2 | 0 | 2 | | 5 |
| 02-Jul | 0 | 3 | 4 | | 0 | 2 | | 9 |
| 03-Jul | 2 | 0 | 1 | 0 | 0 | 3 | | 6 |
| 04-Jul | 4 | 0 | 19 | | 1 | 6 | | 30 |
| 05-Jul | 8 | 11 | 21 | 5 | 2 | 0 | | 47 |
| 06-Jul | 9 | 2 | 7 | | 8 | 0 | | 26 |
| 07-Jul | 0 | 3 | 0 | 0 | 0 | 0 | | 3 |
| 08-Jul | 5 | 42 | 5 | | 0 | 1 | | 53 |
| 09-Jul | 4 | 24 | 17 | 49 | 8 | 1 | | 103 |
| 10-Jul | 25 | 87 | 0 | | 0 | 0 | | 112 |
| 11-Jul | 14 | 4 | 19 | 0 | 5 | 0 | | 42 |
| 12-Jul | 0 | 27 | 48 | | 0 | 1 | | 76 |
| 13-Jul | 1 | 40 | 149 | 140 | 56 | 2 | | 388 |
| 14-Jul | 1 | 2 | 69 | | 0 | 1 | | 73 |
| 15-Jul | 0 | 66 | 85 | 106 | 99 | 15 | | 371 |
| 16-Jul | 2 | 19 | 2 | | 62 | 2 | | 87 |
| 17-Jul | 0 | 78 | 362 | 99 | 114 | 0 | | 653 |
| 18-Jul | 4 | 5 | 2 | | 42 | 0 | | 53 |
| 19-Jul | 2 | 2 | 86 | 10 | 3 | 2 | | 105 |
| 20-Jul | | 96 | 2 | | 60 | 3 | | 161 |
| 21-Jul | 0 | 3 | 48 | 14 | 1 | 1 | | 67 |
| 22-Jul | | 2 | 3 | | 61 | | | 66 |
| 23-Jul | 7 | 23 | 1 | 1 | 3 | 8 | | 43 |
| 24-Jul | 0 | 0 | 1 | | 11 | 9 | | 21 |
| 25-Jul | 0 | 1 | 0 | 0 | 38 | 12 | | 51 |
| 26-Jul | 0 | 0 | 21 | | 78 | 2 | | 101 |
| 27-Jul | 0 | 0 | 0 | 4 | 32 | 18 | | 54 |
| 28-Jul | 0 | 52 | 25 | | 3 | 0 | | 80 |
| 29-Jul | 0 | 45 | 2 | 35 | 62 | 1 | | 145 |
| 30-Jul | 0 | 4 | 13 | | 51 | 6 | | 74 |
| Total | 89 | 641 | 1012 | 465 | 800 | 98 | | 3105 |
| % | 2.9 | 20.6 | 32.6 | 15.0 | 25.8 | 3.2 | | 100.0 |

Table 3. Estimated sockeye salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|-------|-------|-------|-------|------|--|--------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0.8 | 0.0 | 0.0 | 1.6 | 0.0 | 1.7 | | 4.0 |
| 02-Jul | 0.0 | 3.5 | 3.3 | | 0.0 | 1.7 | | 8.5 |
| 03-Jul | 1.7 | 0.0 | 0.8 | 0.0 | 0.0 | 2.5 | | 5.0 |
| 04-Jul | 3.4 | 0.0 | 15.2 | | 0.8 | 4.9 | | 24.3 |
| 05-Jul | 6.3 | 8.6 | 16.8 | 4.1 | 1.7 | 0.0 | | 37.4 |
| 06-Jul | 7.6 | 1.7 | 5.7 | | 6.4 | 0.0 | | 21.4 |
| 07-Jul | 0.0 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | | 2.5 |
| 08-Jul | 4.2 | 29.7 | 4.0 | | 0.0 | 0.8 | | 38.7 |
| 09-Jul | 3.3 | 18.9 | 13.2 | 36.8 | 6.4 | 0.8 | | 79.5 |
| 10-Jul | 19.5 | 62.1 | 0.0 | | 0.0 | 0.0 | | 81.6 |
| 11-Jul | 10.9 | 3.3 | 14.4 | 0.0 | 4.2 | 0.0 | | 32.8 |
| 12-Jul | 0.0 | 19.8 | 32.7 | | 0.0 | 0.8 | | 53.3 |
| 13-Jul | 0.8 | 28.6 | 77.8 | 76.3 | 39.1 | 1.6 | | 224.2 |
| 14-Jul | 0.9 | 1.5 | 40.6 | | 0.0 | 0.8 | | 43.8 |
| 15-Jul | 0.0 | 41.3 | 53.7 | 65.6 | 63.2 | 12.1 | | 236.0 |
| 16-Jul | 1.8 | 15.8 | 1.8 | | 46.1 | 1.2 | | 66.7 |
| 17-Jul | 0.0 | 56.0 | 161.0 | 61.3 | 71.3 | 0.0 | | 349.6 |
| 18-Jul | 3.3 | 4.3 | 1.7 | | 32.7 | 0.0 | | 42.1 |
| 19-Jul | 1.7 | 1.7 | 48.1 | 8.0 | 2.5 | 1.7 | | 63.7 |
| 20-Jul | | 57.2 | 1.7 | | 41.2 | 2.6 | | 102.7 |
| 21-Jul | 0.0 | 2.2 | 31.6 | 10.4 | 1.1 | 0.8 | | 46.2 |
| 22-Jul | | 1.6 | 2.4 | | 36.2 | | | 40.2 |
| 23-Jul | 5.7 | 17.5 | 2.2 | 0.8 | 2.3 | 11.5 | | 39.9 |
| 24-Jul | 0.0 | 0.0 | 0.8 | | 8.2 | 6.7 | | 15.8 |
| 25-Jul | 0.0 | 0.8 | 0.0 | 0.0 | 25.0 | 9.2 | | 35.1 |
| 26-Jul | 0.0 | 0.0 | 15.6 | | 49.3 | 1.7 | | 66.5 |
| 27-Jul | 0.0 | 0.0 | 0.0 | 3.1 | 20.6 | 13.8 | | 37.6 |
| 28-Jul | 0.0 | 39.0 | 19.0 | | 2.5 | 0.0 | | 60.5 |
| 29-Jul | 0.0 | 33.3 | 1.7 | 24.7 | 43.3 | 0.8 | | 103.9 |
| 30-Jul | 0.0 | 3.3 | 10.5 | | 38.3 | 4.9 | | 57.0 |
| Total | 71.9 | 454.3 | 576.4 | 292.7 | 542.6 | 82.8 | | 2020.7 |
| % | 3.6 | 22.5 | 28.5 | 14.5 | 26.9 | 4.1 | | 100.0 |

Table 4. Mean date of the sockeye salmon run across Anchor Point transect, Upper Cook Inlet offshore test fishing project, 1979-1992.

| Year | Mean Date ^a | |
|-----------|------------------------|----------|
| | Coded | Calendar |
| 1979 | 18.4 | July 11 |
| 1980 | 22.7 | July 15 |
| 1981 | 13.2 | July 06 |
| 1982 | 24.2 | July 17 |
| 1983 | 22.6 | July 15 |
| 1984 | 18.4 | July 11 |
| 1985 | 22.7 | July 15 |
| 1986 | 23.0 | July 16 |
| 1987 | 25.7 | July 18 |
| 1988 | 20.6 | July 13 |
| 1989 | 21.6 | July 14 |
| 1990 | 25.6 | July 18 |
| 1991 | 24.3 | July 17 |
| 1992 | 24.3 | July 17 |
| 1979-1992 | 21.9 | July 14 |

^a Day (1) = June 24.

Table 5. The 1992 Upper Cook Inlet commercial salmon harvest.

| Date | Number of Deliveries | CHINOOK Daily Cumulative | SOCKEYE Daily Cumulative | COHO Daily Cumulative | PINK Daily Cumulative | CHUM Daily Cumulative | TOTAL Daily Cumulative |
|----------|----------------------|-----------------------------|-----------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
| 5-25 Mon | 20 | 167 | 167 | 86 | 86 | | 253 |
| 5-29 Fri | 29 | 401 | 568 | 255 | 341 | | 664 |
| 6-01 Mon | 87 | 1,082 | 1,650 | 846 | 1,187 | | 917 |
| 6-05 Fri | 33 | 194 | 1,844 | 1,353 | 2,540 | | 2,845 |
| 6-08 Mon | 139 | 2,191 | 4,035 | 2,737 | 5,277 | 8 | 4,392 |
| 6-15 Mon | 100 | 816 | 4,851 | 1,463 | 6,740 | 8 | 9,482 |
| 6-19 Fri | 22 | 29 | 4,880 | 263 | 7,003 | 145 | 11,761 |
| 6-22 Mon | 22 | 37 | 4,917 | 509 | 7,512 | 36 | 12,054 |
| 6-26 Fri | 428 | 444 | 5,361 | 12,082 | 19,594 | 27 | 25,565 |
| 6-29 Mon | 525 | 193 | 5,554 | 38,734 | 58,328 | 221 | 65,136 |
| 6-30 Tue | 228 | 163 | 5,717 | 20,626 | 78,954 | 5 | 85,963 |
| 7-03 Fri | 886 | 556 | 6,273 | 69,536 | 148,490 | 436 | 159,285 |
| 7-06 Mon | 971 | 460 | 6,733 | 347,240 | 495,730 | 2,444 | 356,604 |
| 7-10 Fri | 977 | 620 | 7,353 | 540,479 | 1,036,209 | 4,673 | 1,069,443 |
| 7-13 Mon | 1275 | 871 | 8,224 | 826,263 | 1,862,472 | 17,389 | 1,947,836 |
| 7-14 Tue | 939 | 903 | 9,127 | 175,039 | 2,037,511 | 1,022 | 2,128,365 |
| 7-15 Wed | 1016 | 287 | 9,414 | 637,706 | 2,675,217 | 19,535 | 2,830,584 |
| 7-16 Thu | 857 | 619 | 10,033 | 206,273 | 2,881,490 | 1,301 | 3,042,919 |
| 7-17 Fri | 1349 | 695 | 10,728 | 842,241 | 3,723,731 | 39,222 | 4,009,713 |
| 7-18 Sat | 1034 | 478 | 11,206 | 259,185 | 3,982,916 | 1,603 | 4,277,494 |
| 7-19 Sun | 18 | | 11,206 | 2,848 | 3,985,764 | 341 | 4,280,829 |
| 7-20 Mon | 1303 | 622 | 11,828 | 878,650 | 4,864,414 | 31,640 | 5,282,390 |
| 7-21 Tue | 1161 | 590 | 12,418 | 458,302 | 5,322,716 | 2,782 | 5,755,006 |
| 7-22 Wed | 1174 | 458 | 12,876 | 619,913 | 5,942,629 | 13,476 | 6,467,374 |
| 7-24 Fri | 1250 | 174 | 13,050 | 737,028 | 6,679,657 | 16,636 | 7,248,614 |
| 7-25 Sat | 528 | 7 | 13,057 | 207,954 | 6,887,611 | 13,700 | 7,495,243 |
| 7-26 Sun | 450 | 4 | 13,061 | 221,004 | 7,108,615 | 17,836 | 7,780,261 |
| 7-27 Mon | 1043 | 387 | 13,448 | 281,193 | 7,389,808 | 18,949 | 8,124,587 |
| 7-28 Tue | 887 | 413 | 13,861 | 234,753 | 7,624,561 | 14,596 | 8,417,285 |
| 7-29 Wed | 879 | 338 | 14,199 | 212,937 | 7,837,498 | 12,635 | 8,668,971 |
| 7-30 Thu | 850 | 288 | 14,487 | 257,280 | 8,094,778 | 20,917 | 8,973,178 |
| 7-31 Fri | 1173 | 314 | 14,801 | 271,914 | 8,366,692 | 37,758 | 9,324,667 |
| 8-01 Sat | 600 | 246 | 15,047 | 52,264 | 8,418,956 | 2,915 | 9,391,354 |
| 8-02 Sun | 474 | 273 | 15,320 | 88,910 | 8,507,866 | 6,490 | 9,506,882 |
| 8-03 Mon | 839 | 341 | 15,661 | 118,922 | 8,626,788 | 21,766 | 9,688,900 |
| 8-04 Tue | 418 | 348 | 16,009 | 58,268 | 8,685,056 | 3,929 | 9,772,884 |
| 8-05 Wed | 503 | 270 | 16,279 | 120,821 | 8,805,877 | 6,492 | 9,935,275 |
| 8-06 Thu | 640 | 261 | 16,540 | 92,840 | 8,898,717 | 11,178 | 10,083,661 |
| 8-07 Fri | 766 | 227 | 16,767 | 109,294 | 9,008,011 | 31,641 | 10,267,130 |
| 8-08 Sat | 510 | 216 | 16,983 | 39,414 | 9,047,425 | 6,826 | 10,497,747 |
| 8-10 Mon | 568 | 132 | 17,115 | 28,864 | 9,076,289 | 21,142 | 10,546,527 |
| 8-14 Fri | 335 | 48 | 17,163 | 22,044 | 9,098,333 | 22,207 | 10,557,620 |
| 8-17 Mon | 166 | 1 | 17,164 | 3,442 | 9,101,775 | 11,380 | 10,559,557 |
| 8-19 Wed | 86 | 3 | 17,167 | 1,390 | 9,103,165 | 9,488 | 10,561,298 |
| 8-21 Fri | 98 | 1 | 17,168 | 1,633 | 9,104,798 | 7,076 | 10,563,301 |
| 8-24 Mon | 51 | | 17,168 | 577 | 9,105,375 | 2,691 | 10,564,500 |
| 8-26 Wed | 75 | 1 | 17,169 | 1,125 | 9,106,500 | 5,109 | 10,564,500 |
| 8-28 Fri | 62 | 2 | 17,171 | 792 | 9,107,292 | 3,440 | 10,564,500 |
| 8-31 Mon | 25 | 17,171 | 361 | 9,107,653 | 1,522 | 464,617 | 1,937 |
| 9-02 Wed | 19 | 17,171 | 357 | 9,108,010 | 1,370 | 465,987 | 1,947 |
| 9-04 Fri | 26 | 17,171 | 233 | 9,108,243 | 1,753 | 467,740 | 1,957 |
| 9-07 Mon | 15 | 17,171 | 14 | 9,108,257 | 784 | 468,524 | 1,967 |
| 9-09 Wed | 9 | 17,171 | 3 | 9,108,260 | 259 | 468,783 | 1,977 |
| 9-11 Fri | 4 | 17,171 | 80 | 9,108,340 | 48 | 468,831 | 1,987 |
| 9-14 Mon | 4 | 17,171 | | 9,108,340 | 80 | 468,911 | 1,997 |

Table 6. Total offshore test fishing CPUE and total sockeye salmon run estimates, Upper Cook Inlet, 1992.

| Date | Cum CPUE ^a | Best Fit Year | MSSDEV ^b | Passage Rate | Total CPUE | Total Run Estimate (X 10 ⁶) | Percent Error ^c |
|---------|-----------------------|---------------|---------------------|--------------|------------|---|----------------------------|
| 13 July | 613.3 | 1990 | .0003 | 4,569 | 2,399 | 10.9 | 0.9 |
| 17 July | 1309.4 | 1990 | .0007 | 3,732 | 2,818 | 10.5 | 2.8 |
| 20 July | 1517.9 | 1990 | .0007 | 4,100 | 2,773 | 11.4 | 5.6 |
| 24 July | 1660.0 | 1990 | .002 | 4,793 | 2,519 | 12.1 | 12.0 |

^a Cumulative CPUE from start of test fishing to estimated end of total run.

^b Mean sum of squared deviation.

^c Percent error = $\frac{\text{predicted}-\text{actual}}{\text{actual}} * 100$

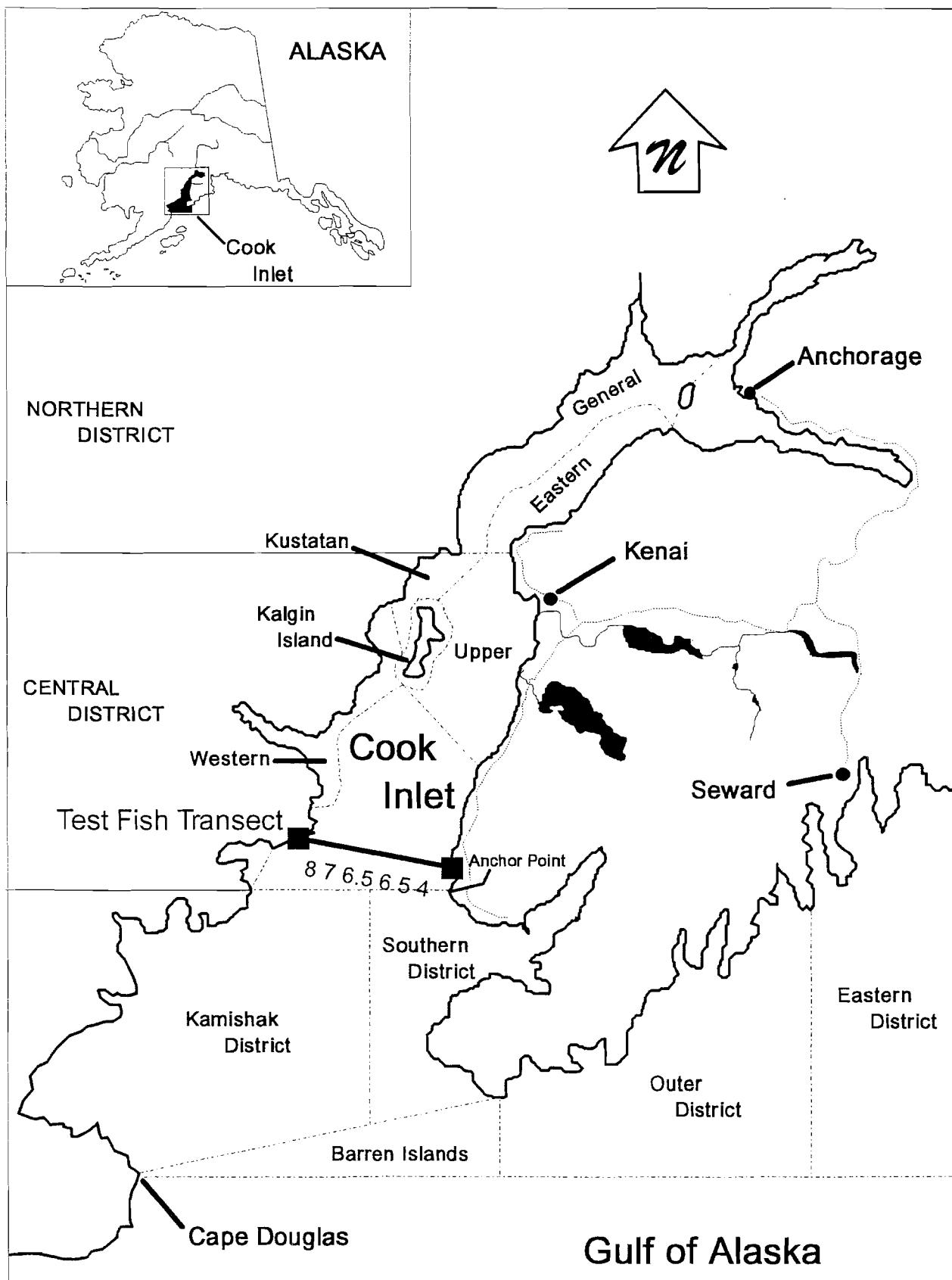


Figure 1. Location of fishing districts and offshore test fish transect in Cook Inlet, Alaska, 1992.

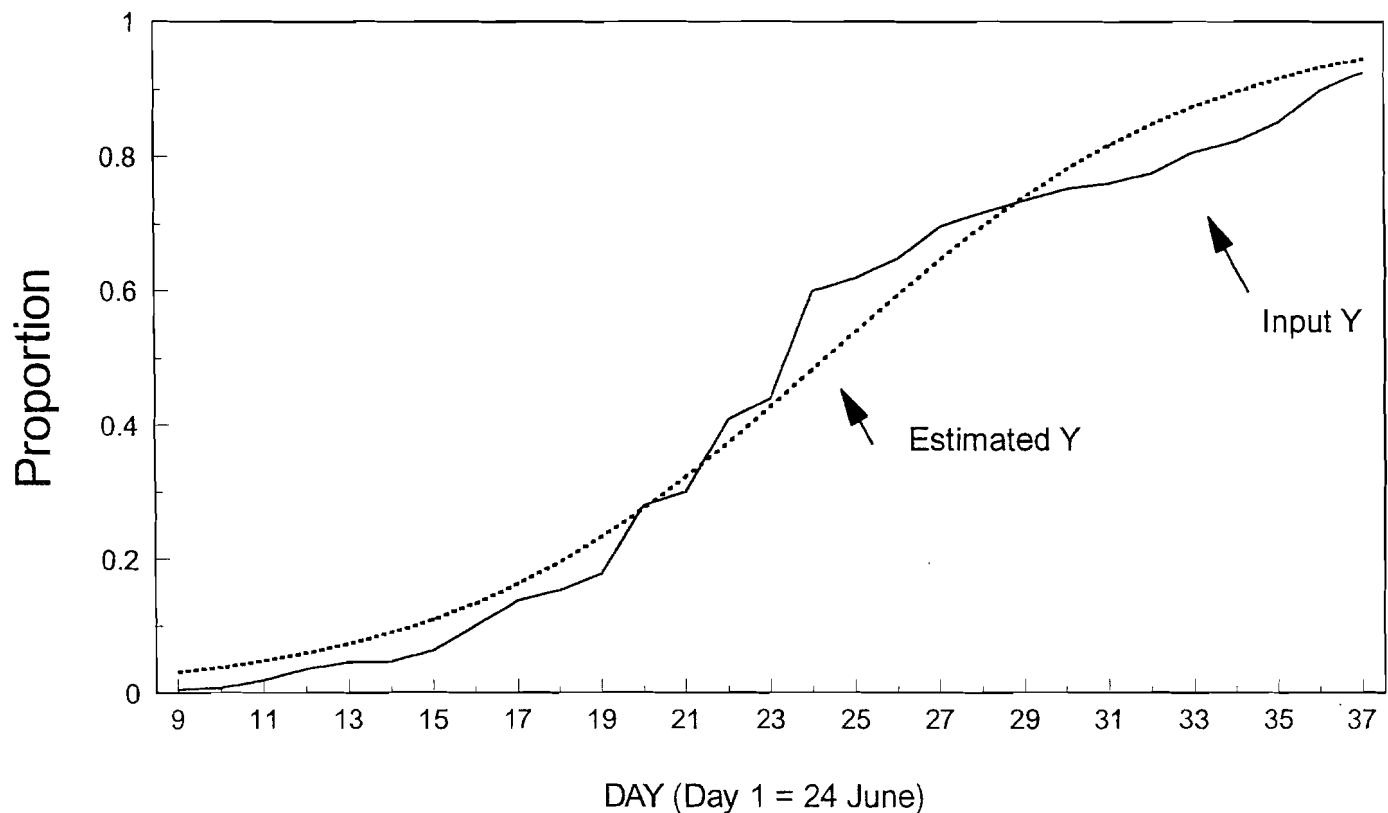


Figure 2. Cumulative proportions estimated for the sockeye salmon return to Upper Cook Inlet ,Alaska, in 1992.

Appendix A1. Summary of pink salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1992.

| Date | Number of Stations | Mean Fishing Time (min) | Catch | | CPUE | |
|--------|--------------------------|----------------------------------|-------|--------|-------|--------|
| | | | Daily | Cumul. | Daily | Cumul. |
| 01-Jul | 6 | 211.5 | 0 | 0 | 0.0 | 0.0 |
| 02-Jul | 5 | 172.0 | 0 | 0 | 0.0 | 0.0 |
| 03-Jul | 6 | 213.5 | 0 | 0 | 0.0 | 0.0 |
| 04-Jul | 5 | 180.5 | 0 | 0 | 0.0 | 0.0 |
| 05-Jul | 6 | 223.0 | 4 | 4 | 3.2 | 3.2 |
| 06-Jul | 5 | 181.5 | 0 | 4 | 0.0 | 3.2 |
| 07-Jul | 6 | 216.5 | 0 | 4 | 0.0 | 3.2 |
| 08-Jul | 5 | 188.5 | 2 | 6 | 1.6 | 4.8 |
| 09-Jul | 6 | 226.5 | 1 | 7 | 0.8 | 5.6 |
| 10-Jul | 5 | 189.5 | 0 | 7 | 0.0 | 5.6 |
| 11-Jul | 6 | 210.5 | 6 | 13 | 6.1 | 11.8 |
| 12-Jul | 5 | 194.5 | 8 | 21 | 5.6 | 17.4 |
| 13-Jul | 6 | 272.5 | 29 | 50 | 17.7 | 35.0 |
| 14-Jul | 5 | 198.0 | 8 | 58 | 4.7 | 39.7 |
| 15-Jul | 6 | 266.5 | 40 | 98 | 24.7 | 64.4 |
| 16-Jul | 5 | 202.0 | 12 | 110 | 9.0 | 73.5 |
| 17-Jul | 6 | 290.0 | 38 | 148 | 21.3 | 94.8 |
| 18-Jul | 5 | 188.0 | 5 | 153 | 4.0 | 98.8 |
| 19-Jul | 6 | 247.0 | 8 | 161 | 5.3 | 104.1 |
| 20-Jul | 4 | 173.0 | 9 | 170 | 6.2 | 110.3 |
| 21-Jul | 6 | 225.0 | 29 | 199 | 23.6 | 133.9 |
| 22-Jul | 3 | 126.0 | 13 | 212 | 9.3 | 143.3 |
| 23-Jul | 6 | 190.5 | 7 | 219 | 5.4 | 148.6 |
| 24-Jul | 5 | 186.5 | 15 | 234 | 11.4 | 160.1 |
| 25-Jul | 6 | 234.0 | 16 | 250 | 11.9 | 172.0 |
| 26-Jul | 5 | 193.5 | 25 | 275 | 17.4 | 189.4 |
| 27-Jul | 6 | 231.0 | 21 | 296 | 14.1 | 203.5 |
| 28-Jul | 5 | 186.0 | 3 | 299 | 2.5 | 206.0 |
| 29-Jul | 6 | 233.0 | 14 | 313 | 10.0 | 215.9 |
| 30-Jul | 5 | 184.0 | 13 | 326 | 10.6 | 226.6 |

Appendix A2. Estimated pink salmon catch by date
and station, Upper Cook Inlet offshore test
fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|------|------|------|------|-----|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 02-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 03-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 04-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 05-Jul | 1 | 1 | 1 | 1 | 0 | 0 | | 4 |
| 06-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 07-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 08-Jul | 1 | 0 | 1 | | 0 | 0 | | 2 |
| 09-Jul | 1 | 0 | 0 | 0 | 0 | 0 | | 1 |
| 10-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 11-Jul | 2 | 1 | 0 | 3 | 0 | 0 | | 6 |
| 12-Jul | 0 | 3 | 5 | | 0 | 0 | | 8 |
| 13-Jul | 0 | 5 | 9 | 8 | 6 | 1 | | 29 |
| 14-Jul | 0 | 0 | 8 | | 0 | 0 | | 8 |
| 15-Jul | 0 | 4 | 4 | 15 | 11 | 6 | | 40 |
| 16-Jul | 3 | 0 | 0 | | 7 | 2 | | 12 |
| 17-Jul | 0 | 7 | 17 | 9 | 5 | 0 | | 38 |
| 18-Jul | 2 | 0 | 1 | | 2 | 0 | | 5 |
| 19-Jul | 1 | 0 | 5 | 1 | 1 | 0 | | 8 |
| 20-Jul | | 3 | 1 | | 4 | 1 | | 9 |
| 21-Jul | 0 | 19 | 1 | 3 | 5 | 1 | | 29 |
| 22-Jul | | 5 | 3 | | 5 | | | 13 |
| 23-Jul | 0 | 0 | 0 | 2 | 5 | 0 | | 7 |
| 24-Jul | 0 | 2 | 0 | | 3 | 10 | | 15 |
| 25-Jul | 0 | 1 | 0 | 10 | 4 | 1 | | 16 |
| 26-Jul | 0 | 1 | 13 | | 11 | 0 | | 25 |
| 27-Jul | 0 | 0 | 0 | 2 | 17 | 2 | | 21 |
| 28-Jul | 1 | 1 | 0 | | 1 | 0 | | 3 |
| 29-Jul | 1 | 1 | 0 | 6 | 6 | 0 | | 14 |
| 30-Jul | 2 | 3 | 5 | | 2 | 1 | | 13 |
| Total | 15 | 57 | 74 | 60 | 95 | 25 | | 326 |
| % | 4.6 | 17.5 | 22.7 | 18.4 | 29.1 | 7.7 | | 100.0 |

Appendix A3. Estimated pink salmon CPUE by date
and station, Upper Cook Inlet offshore test
fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|------|------|------|------|------|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 02-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 03-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 04-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 05-Jul | 0.8 | 0.8 | 0.8 | 0.8 | 0.0 | 0.0 | | 3.2 |
| 06-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 07-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 08-Jul | 0.8 | 0.0 | 0.8 | | 0.0 | 0.0 | | 1.6 |
| 09-Jul | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.8 |
| 10-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 11-Jul | 1.6 | 0.8 | 0.0 | 3.7 | 0.0 | 0.0 | | 6.1 |
| 12-Jul | 0.0 | 2.2 | 3.4 | | 0.0 | 0.0 | | 5.6 |
| 13-Jul | 0.0 | 3.6 | 4.7 | 4.4 | 4.2 | 0.8 | | 17.7 |
| 14-Jul | 0.0 | 0.0 | 4.7 | | 0.0 | 0.0 | | 4.7 |
| 15-Jul | 0.0 | 2.5 | 2.5 | 8.0 | 7.0 | 4.6 | | 24.7 |
| 16-Jul | 2.6 | 0.0 | 0.0 | | 5.2 | 1.2 | | 9.0 |
| 17-Jul | 0.0 | 5.0 | 7.6 | 5.6 | 3.1 | 0.0 | | 21.3 |
| 18-Jul | 1.6 | 0.0 | 0.8 | | 1.6 | 0.0 | | 4.0 |
| 19-Jul | 0.9 | 0.0 | 2.8 | 0.8 | 0.8 | 0.0 | | 5.3 |
| 20-Jul | | 1.8 | 0.8 | | 2.7 | 0.9 | | 6.2 |
| 21-Jul | 0.0 | 14.2 | 0.7 | 2.2 | 5.7 | 0.8 | | 23.6 |
| 22-Jul | | 4.0 | 2.4 | | 3.0 | | | 9.3 |
| 23-Jul | 0.0 | 0.0 | 0.0 | 1.6 | 3.8 | 0.0 | | 5.4 |
| 24-Jul | 0.0 | 1.7 | 0.0 | | 2.2 | 7.5 | | 11.4 |
| 25-Jul | 0.0 | 0.8 | 0.0 | 7.7 | 2.6 | 0.8 | | 11.9 |
| 26-Jul | 0.0 | 0.8 | 9.6 | | 7.0 | 0.0 | | 17.4 |
| 27-Jul | 0.0 | 0.0 | 0.0 | 1.6 | 11.0 | 1.5 | | 14.1 |
| 28-Jul | 0.9 | 0.7 | 0.0 | | 0.8 | 0.0 | | 2.5 |
| 29-Jul | 0.8 | 0.7 | 0.0 | 4.2 | 4.2 | 0.0 | | 10.0 |
| 30-Jul | 1.7 | 2.5 | 4.1 | | 1.5 | 0.8 | | 10.6 |
| Total | 12.5 | 42.3 | 45.7 | 40.6 | 66.5 | 19.0 | | 226.6 |
| % | 5.5 | 18.7 | 20.2 | 17.9 | 29.3 | 8.4 | | 100.0 |

Appendix B1. Summary of chum salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1992.

| Date | Number of Stations | Mean Fishing Time (min) | Catch | | CPUE | |
|--------|--------------------------|----------------------------------|-------|--------|-------|--------|
| | | | Daily | Cumul. | Daily | Cumul. |
| 01-Jul | 6 | 211.5 | 0 | 0 | 0.0 | 0.0 |
| 02-Jul | 5 | 172.0 | 2 | 2 | 2.3 | 2.3 |
| 03-Jul | 6 | 213.5 | 1 | 3 | 1.1 | 3.4 |
| 04-Jul | 5 | 180.5 | 7 | 10 | 5.6 | 9.0 |
| 05-Jul | 6 | 223.0 | 2 | 12 | 1.6 | 10.6 |
| 06-Jul | 5 | 181.5 | 4 | 16 | 3.2 | 13.8 |
| 07-Jul | 6 | 216.5 | 2 | 18 | 1.6 | 15.4 |
| 08-Jul | 5 | 188.5 | 2 | 20 | 1.6 | 17.0 |
| 09-Jul | 6 | 226.5 | 6 | 26 | 4.7 | 21.7 |
| 10-Jul | 5 | 189.5 | 3 | 29 | 2.1 | 23.8 |
| 11-Jul | 6 | 210.5 | 1 | 30 | 0.8 | 24.6 |
| 12-Jul | 5 | 194.5 | 16 | 46 | 11.3 | 35.9 |
| 13-Jul | 6 | 272.5 | 81 | 127 | 46.7 | 82.6 |
| 14-Jul | 5 | 198.0 | 25 | 152 | 15.3 | 97.8 |
| 15-Jul | 6 | 266.5 | 61 | 213 | 39.6 | 137.5 |
| 16-Jul | 5 | 202.0 | 16 | 229 | 13.1 | 150.6 |
| 17-Jul | 6 | 290.0 | 88 | 317 | 49.1 | 199.6 |
| 18-Jul | 5 | 188.0 | 4 | 321 | 3.4 | 203.0 |
| 19-Jul | 6 | 247.0 | 60 | 381 | 38.9 | 241.9 |
| 20-Jul | 4 | 173.0 | 30 | 411 | 21.0 | 262.9 |
| 21-Jul | 6 | 225.0 | 25 | 436 | 17.2 | 280.1 |
| 22-Jul | 3 | 126.0 | 26 | 462 | 15.6 | 295.8 |
| 23-Jul | 6 | 190.5 | 14 | 476 | 12.0 | 307.8 |
| 24-Jul | 5 | 186.5 | 17 | 493 | 12.7 | 320.5 |
| 25-Jul | 6 | 234.0 | 35 | 528 | 25.0 | 345.5 |
| 26-Jul | 5 | 193.5 | 44 | 572 | 29.8 | 375.3 |
| 27-Jul | 6 | 231.0 | 55 | 627 | 37.0 | 412.4 |
| 28-Jul | 5 | 186.0 | 4 | 631 | 3.0 | 415.4 |
| 29-Jul | 6 | 233.0 | 12 | 643 | 8.7 | 424.1 |
| 30-Jul | 5 | 184.0 | 24 | 667 | 19.0 | 443.1 |

Appendix B2. Estimated chum salmon catch by date
and station, Upper Cook Inlet offshore test
fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|-----|------|------|------|-----|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 02-Jul | 0 | 2 | 0 | | 0 | 0 | | 2 |
| 03-Jul | 0 | 0 | 0 | 0 | 1 | 0 | | 1 |
| 04-Jul | 0 | 0 | 7 | | 0 | 0 | | 7 |
| 05-Jul | 1 | 1 | 0 | 0 | 0 | 0 | | 2 |
| 06-Jul | 0 | 0 | 2 | | 2 | 0 | | 4 |
| 07-Jul | 0 | 0 | 2 | 0 | 0 | 0 | | 2 |
| 08-Jul | 0 | 0 | 2 | | 0 | 0 | | 2 |
| 09-Jul | 0 | 2 | 1 | 3 | 0 | 0 | | 6 |
| 10-Jul | 0 | 3 | 0 | | 0 | 0 | | 3 |
| 11-Jul | 0 | 0 | 1 | 0 | 0 | 0 | | 1 |
| 12-Jul | 1 | 5 | 10 | | 0 | 0 | | 16 |
| 13-Jul | 0 | 4 | 31 | 31 | 13 | 2 | | 81 |
| 14-Jul | 0 | 2 | 22 | | 1 | 0 | | 25 |
| 15-Jul | 0 | 10 | 8 | 15 | 20 | 8 | | 61 |
| 16-Jul | 0 | 4 | 6 | | 6 | 0 | | 16 |
| 17-Jul | 0 | 2 | 33 | 32 | 21 | 0 | | 88 |
| 18-Jul | 0 | 1 | 2 | | 1 | 0 | | 4 |
| 19-Jul | 0 | 1 | 41 | 6 | 5 | 7 | | 60 |
| 20-Jul | | 4 | 5 | | 21 | 0 | | 30 |
| 21-Jul | 0 | 4 | 18 | 2 | 0 | 1 | | 25 |
| 22-Jul | 0 | 1 | | | 25 | | | 26 |
| 23-Jul | 0 | 3 | 0 | 1 | 8 | 2 | | 14 |
| 24-Jul | 0 | 0 | 0 | | 14 | 3 | | 17 |
| 25-Jul | 0 | 0 | 0 | 2 | 17 | 16 | | 35 |
| 26-Jul | 1 | 0 | 16 | | 27 | 0 | | 44 |
| 27-Jul | 0 | 0 | 0 | 5 | 43 | 7 | | 55 |
| 28-Jul | 0 | 3 | 1 | | 0 | 0 | | 4 |
| 29-Jul | 0 | 0 | 0 | 7 | 3 | 2 | | 12 |
| 30-Jul | 0 | 7 | 7 | | 10 | 0 | | 24 |
| Total | 3 | 58 | 216 | 104 | 238 | 48 | | 667 |
| % | 0.4 | 8.7 | 32.4 | 15.6 | 35.7 | 7.2 | | 100.0 |

Appendix B3. Estimated chum salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 1992.

| Date | Station Number | | | | | | Total |
|--------|----------------|------|-------|------|-------|------|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | |
| 01-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 02-Jul | 0.0 | 2.3 | 0.0 | | 0.0 | 0.0 | 2.3 |
| 03-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 | 1.1 |
| 04-Jul | 0.0 | 0.0 | 5.6 | | 0.0 | 0.0 | 5.6 |
| 05-Jul | 0.8 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 |
| 06-Jul | 0.0 | 0.0 | 1.6 | | 1.6 | 0.0 | 3.2 |
| 07-Jul | 0.0 | 0.0 | 1.6 | 0.0 | 0.0 | 0.0 | 1.6 |
| 08-Jul | 0.0 | 0.0 | 1.6 | | 0.0 | 0.0 | 1.6 |
| 09-Jul | 0.0 | 1.6 | 0.8 | 2.3 | 0.0 | 0.0 | 4.7 |
| 10-Jul | 0.0 | 2.1 | 0.0 | | 0.0 | 0.0 | 2.1 |
| 11-Jul | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.8 |
| 12-Jul | 0.8 | 3.7 | 6.8 | | 0.0 | 0.0 | 11.3 |
| 13-Jul | 0.0 | 2.9 | 16.2 | 16.9 | 9.1 | 1.6 | 46.7 |
| 14-Jul | 0.0 | 1.5 | 12.9 | | 0.8 | 0.0 | 15.3 |
| 15-Jul | 0.0 | 6.3 | 5.1 | 9.3 | 12.8 | 6.1 | 39.6 |
| 16-Jul | 0.0 | 3.3 | 5.3 | | 4.5 | 0.0 | 13.1 |
| 17-Jul | 0.0 | 1.4 | 14.7 | 19.8 | 13.1 | 0.0 | 49.1 |
| 18-Jul | 0.0 | 0.9 | 1.7 | | 0.8 | 0.0 | 3.4 |
| 19-Jul | 0.0 | 0.9 | 22.9 | 4.8 | 4.2 | 6.1 | 38.9 |
| 20-Jul | | 2.4 | 4.2 | | 14.4 | 0.0 | 21.0 |
| 21-Jul | 0.0 | 3.0 | 11.9 | 1.5 | 0.0 | 0.8 | 17.2 |
| 22-Jul | 0.0 | 0.8 | | | 14.8 | | 15.6 |
| 23-Jul | 0.0 | 2.3 | 0.0 | 0.8 | 6.1 | 2.9 | 12.0 |
| 24-Jul | 0.0 | 0.0 | 0.0 | | 10.5 | 2.2 | 12.7 |
| 25-Jul | 0.0 | 0.0 | 0.0 | 1.5 | 11.2 | 12.3 | 25.0 |
| 26-Jul | 0.9 | 0.0 | 11.9 | | 17.1 | 0.0 | 29.8 |
| 27-Jul | 0.0 | 0.0 | 0.0 | 3.9 | 27.7 | 5.4 | 37.0 |
| 28-Jul | 0.0 | 2.2 | 0.8 | | 0.0 | 0.0 | 3.0 |
| 29-Jul | 0.0 | 0.0 | 0.0 | 4.9 | 2.1 | 1.7 | 8.7 |
| 30-Jul | 0.0 | 5.8 | 5.7 | | 7.5 | 0.0 | 19.0 |
| Total | 2.4 | 43.4 | 132.9 | 65.8 | 159.5 | 39.1 | 443.1 |
| % | 0.6 | 9.8 | 30.0 | 14.8 | 36.0 | 8.8 | 100.0 |

Appendix C1. Summary of coho salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1992.

| Date | Number of Stations | Mean Fishing Time (min) | Catch | | CPUE | |
|--------|--------------------------|----------------------------------|-------|--------|-------|--------|
| | | | Daily | Cumul. | Daily | Cumul. |
| 01-Jul | 6 | 211.5 | 0 | 0 | 0.0 | 0.0 |
| 02-Jul | 5 | 172.0 | 0 | 0 | 0.0 | 0.0 |
| 03-Jul | 6 | 213.5 | 1 | 1 | 0.8 | 0.8 |
| 04-Jul | 5 | 180.5 | 0 | 1 | 0.0 | 0.8 |
| 05-Jul | 6 | 223.0 | 1 | 2 | 0.8 | 1.6 |
| 06-Jul | 5 | 181.5 | 0 | 2 | 0.0 | 1.6 |
| 07-Jul | 6 | 216.5 | 0 | 2 | 0.0 | 1.6 |
| 08-Jul | 5 | 188.5 | 4 | 6 | 2.9 | 4.6 |
| 09-Jul | 6 | 226.5 | 0 | 6 | 0.0 | 4.6 |
| 10-Jul | 5 | 189.5 | 0 | 6 | 0.0 | 4.6 |
| 11-Jul | 6 | 210.5 | 9 | 15 | 6.9 | 11.5 |
| 12-Jul | 5 | 194.5 | 13 | 28 | 9.2 | 20.7 |
| 13-Jul | 6 | 272.5 | 37 | 65 | 20.9 | 41.6 |
| 14-Jul | 5 | 198.0 | 32 | 97 | 19.1 | 60.7 |
| 15-Jul | 6 | 266.5 | 38 | 135 | 25.3 | 86.0 |
| 16-Jul | 5 | 202.0 | 10 | 145 | 7.4 | 93.4 |
| 17-Jul | 6 | 290.0 | 40 | 185 | 21.6 | 115.0 |
| 18-Jul | 5 | 188.0 | 4 | 189 | 3.4 | 118.4 |
| 19-Jul | 6 | 247.0 | 45 | 234 | 28.8 | 147.2 |
| 20-Jul | 4 | 173.0 | 22 | 256 | 14.9 | 162.1 |
| 21-Jul | 6 | 225.0 | 26 | 282 | 19.7 | 181.8 |
| 22-Jul | 3 | 126.0 | 25 | 307 | 14.8 | 196.7 |
| 23-Jul | 6 | 190.5 | 14 | 321 | 14.8 | 211.5 |
| 24-Jul | 5 | 186.5 | 10 | 331 | 7.6 | 219.0 |
| 25-Jul | 6 | 234.0 | 27 | 358 | 19.9 | 239.0 |
| 26-Jul | 5 | 193.5 | 33 | 391 | 21.8 | 260.8 |
| 27-Jul | 6 | 231.0 | 25 | 416 | 17.5 | 278.3 |
| 28-Jul | 5 | 186.0 | 5 | 421 | 3.8 | 282.0 |
| 29-Jul | 6 | 233.0 | 13 | 434 | 9.7 | 291.8 |
| 30-Jul | 5 | 184.0 | 10 | 444 | 7.6 | 299.4 |

Appendix C2. Estimated coho salmon catch by date
and station, Upper Cook Inlet offshore test
fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|-----|------|------|------|------|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 02-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 03-Jul | 0 | 0 | 1 | 0 | 0 | 0 | | 1 |
| 04-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 05-Jul | 0 | 0 | 0 | 1 | 0 | 0 | | 1 |
| 06-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 07-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 08-Jul | 0 | 3 | 1 | | 0 | 0 | | 4 |
| 09-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 10-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 11-Jul | 3 | 0 | 6 | 0 | 0 | 0 | | 9 |
| 12-Jul | 2 | 3 | 8 | | 0 | 0 | | 13 |
| 13-Jul | 0 | 1 | 20 | 9 | 7 | 0 | | 37 |
| 14-Jul | 0 | 0 | 31 | | 1 | 0 | | 32 |
| 15-Jul | 0 | 2 | 5 | 14 | 6 | 11 | | 38 |
| 16-Jul | 0 | 0 | 1 | | 8 | 1 | | 10 |
| 17-Jul | 0 | 3 | 20 | 10 | 7 | 0 | | 40 |
| 18-Jul | 1 | 2 | 1 | | 0 | 0 | | 4 |
| 19-Jul | 3 | 0 | 32 | 5 | 2 | 3 | | 45 |
| 20-Jul | 3 | 0 | | | 18 | 1 | | 22 |
| 21-Jul | 1 | 2 | 6 | 14 | 2 | 1 | | 26 |
| 22-Jul | 0 | 0 | | | 25 | | | 25 |
| 23-Jul | 0 | 0 | 0 | 5 | 3 | 6 | | 14 |
| 24-Jul | 0 | 0 | 1 | | 1 | 8 | | 10 |
| 25-Jul | 0 | 1 | 0 | 11 | 8 | 7 | | 27 |
| 26-Jul | 0 | 0 | 9 | | 24 | 0 | | 33 |
| 27-Jul | 0 | 0 | 1 | 6 | 15 | 3 | | 25 |
| 28-Jul | 0 | 4 | 1 | | 0 | 0 | | 5 |
| 29-Jul | 1 | 1 | 0 | 3 | 5 | 3 | | 13 |
| 30-Jul | 0 | 0 | 1 | | 8 | 1 | | 10 |
| Total | 11 | 25 | 145 | 78 | 140 | 45 | | 444 |
| % | 2.5 | 5.6 | 32.7 | 17.6 | 31.5 | 10.1 | | 100.0 |

Appendix C3. Estimated coho salmon CPUE by date
and station, Upper Cook Inlet offshore test
fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|------|------|------|------|------|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 02-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 03-Jul | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | | 0.8 |
| 04-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 05-Jul | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | | 0.8 |
| 06-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 07-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 08-Jul | 0.0 | 2.1 | 0.8 | | 0.0 | 0.0 | | 2.9 |
| 09-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 10-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 11-Jul | 2.3 | 0.0 | 4.5 | 0.0 | 0.0 | 0.0 | | 6.9 |
| 12-Jul | 1.6 | 2.2 | 5.5 | | 0.0 | 0.0 | | 9.2 |
| 13-Jul | 0.0 | 0.7 | 10.4 | 4.9 | 4.9 | 0.0 | | 20.9 |
| 14-Jul | 0.0 | 0.0 | 18.2 | | 0.8 | 0.0 | | 19.1 |
| 15-Jul | 0.0 | 1.3 | 3.2 | 8.7 | 3.8 | 8.3 | | 25.3 |
| 16-Jul | 0.0 | 0.0 | 0.9 | | 5.9 | 0.6 | | 7.4 |
| 17-Jul | 0.0 | 2.1 | 8.9 | 6.2 | 4.4 | 0.0 | | 21.6 |
| 18-Jul | 0.8 | 1.7 | 0.8 | | 0.0 | 0.0 | | 3.4 |
| 19-Jul | 2.6 | 0.0 | 17.9 | 4.0 | 1.7 | 2.6 | | 28.8 |
| 20-Jul | | 1.8 | 0.0 | | 12.2 | 0.9 | | 14.9 |
| 21-Jul | 0.8 | 1.5 | 3.9 | 10.4 | 2.3 | 0.8 | | 19.7 |
| 22-Jul | | 0.0 | 0.0 | | 14.8 | | | 14.8 |
| 23-Jul | 0.0 | 0.0 | 0.0 | 3.9 | 2.3 | 8.6 | | 14.8 |
| 24-Jul | 0.0 | 0.0 | 0.8 | | 0.7 | 6.0 | | 7.6 |
| 25-Jul | 0.0 | 0.8 | 0.0 | 8.5 | 5.3 | 5.4 | | 19.9 |
| 26-Jul | 0.0 | 0.0 | 6.7 | | 15.2 | 0.0 | | 21.8 |
| 27-Jul | 0.0 | 0.0 | 0.8 | 4.7 | 9.7 | 2.3 | | 17.5 |
| 28-Jul | 0.0 | 3.0 | 0.8 | | 0.0 | 0.0 | | 3.8 |
| 29-Jul | 0.8 | 0.7 | 0.0 | 2.1 | 3.5 | 2.5 | | 9.7 |
| 30-Jul | 0.0 | 0.0 | 0.8 | | 6.0 | 0.8 | | 7.6 |
| Total | 9.0 | 18.1 | 85.8 | 54.2 | 93.5 | 38.9 | | 299.4 |
| % | 3.0 | 6.0 | 28.7 | 18.1 | 31.2 | 13.0 | | 100.0 |

Appendix D1. Summary of chinook salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 1992.

| Date | Number of Stations | Mean Fishing Time (min) | Catch | | CPUE | |
|--------|--------------------------|----------------------------------|-------|--------|-------|--------|
| | | | Daily | Cumul. | Daily | Cumul. |
| 01-Jul | 6 | 211.5 | 1 | 1 | 0.8 | 0.8 |
| 02-Jul | 5 | 172.0 | 1 | 2 | 0.8 | 1.6 |
| 03-Jul | 6 | 213.5 | 0 | 2 | 0.0 | 1.6 |
| 04-Jul | 5 | 180.5 | 0 | 2 | 0.0 | 1.6 |
| 05-Jul | 6 | 223.0 | 0 | 2 | 0.0 | 1.6 |
| 06-Jul | 5 | 181.5 | 1 | 3 | 0.8 | 2.5 |
| 07-Jul | 6 | 216.5 | 0 | 3 | 0.0 | 2.5 |
| 08-Jul | 5 | 188.5 | 0 | 3 | 0.0 | 2.5 |
| 09-Jul | 6 | 226.5 | 0 | 3 | 0.0 | 2.5 |
| 10-Jul | 5 | 189.5 | 0 | 3 | 0.0 | 2.5 |
| 11-Jul | 6 | 210.5 | 0 | 3 | 0.0 | 2.5 |
| 12-Jul | 5 | 194.5 | 0 | 3 | 0.0 | 2.5 |
| 13-Jul | 6 | 272.5 | 0 | 3 | 0.0 | 2.5 |
| 14-Jul | 5 | 198.0 | 0 | 3 | 0.0 | 2.5 |
| 15-Jul | 6 | 266.5 | 0 | 3 | 0.0 | 2.5 |
| 16-Jul | 5 | 202.0 | 0 | 3 | 0.0 | 2.5 |
| 17-Jul | 6 | 290.0 | 0 | 3 | 0.0 | 2.5 |
| 18-Jul | 5 | 188.0 | 0 | 3 | 0.0 | 2.5 |
| 19-Jul | 6 | 247.0 | 0 | 3 | 0.0 | 2.5 |
| 20-Jul | 4 | 173.0 | 0 | 3 | 0.0 | 2.5 |
| 21-Jul | 6 | 225.0 | 0 | 3 | 0.0 | 2.5 |
| 22-Jul | 3 | 126.0 | 0 | 3 | 0.0 | 2.5 |
| 23-Jul | 6 | 190.5 | 0 | 3 | 0.0 | 2.5 |
| 24-Jul | 5 | 186.5 | 0 | 3 | 0.0 | 2.5 |
| 25-Jul | 6 | 234.0 | 0 | 3 | 0.0 | 2.5 |
| 26-Jul | 5 | 193.5 | 0 | 3 | 0.0 | 2.5 |
| 27-Jul | 6 | 231.0 | 0 | 3 | 0.0 | 2.5 |
| 28-Jul | 5 | 186.0 | 0 | 3 | 0.0 | 2.5 |
| 29-Jul | 6 | 233.0 | 0 | 3 | 0.0 | 2.5 |
| 30-Jul | 5 | 184.0 | 0 | 3 | 0.0 | 2.5 |

Appendix D2. Estimated chinook salmon catch by date and station, Upper Cook Inlet offshore test fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|-----|------|-----|------|------|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0 | 0 | 0 | 0 | 0 | 1 | | 1 |
| 02-Jul | 0 | 0 | 0 | | 1 | 0 | | 1 |
| 03-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 04-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 05-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 06-Jul | 0 | 0 | 1 | | 0 | 0 | | 1 |
| 07-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 08-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 09-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 10-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 11-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 12-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 13-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 14-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 15-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 16-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 17-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 18-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 19-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 20-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 21-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 22-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 23-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 24-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 25-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 26-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 27-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 28-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| 29-Jul | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 30-Jul | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Total | 0 | 0 | 1 | 0 | 1 | 1 | | 3 |
| % | 0.0 | 0.0 | 33.3 | 0.0 | 33.3 | 33.3 | | 100.0 |

Appendix D3. Estimated chinook salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 1992.

| Date | Station Number | | | | | | | Total |
|--------|----------------|-----|------|-----|------|------|--|-------|
| | 4 | 5 | 6 | 6.5 | 7 | 8 | | |
| 01-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | | 0.8 |
| 02-Jul | 0.0 | 0.0 | 0.0 | | 0.8 | 0.0 | | 0.8 |
| 03-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 04-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 05-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 06-Jul | 0.0 | 0.0 | 0.8 | | 0.0 | 0.0 | | 0.8 |
| 07-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 08-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 09-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 10-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 11-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 12-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 13-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 14-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 15-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 16-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 17-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 18-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 19-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 20-Jul | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 |
| 21-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 22-Jul | 0.0 | 0.0 | | | 0.0 | | | 0.0 |
| 23-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 24-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 25-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 26-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 27-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 28-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| 29-Jul | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| 30-Jul | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| Total | 0.0 | 0.0 | 0.8 | 0.0 | 0.8 | 0.8 | | 2.5 |
| % | 0.0 | 0.0 | 33.0 | 0.0 | 33.0 | 33.9 | | 100.0 |

Appendix E.1. Entry pattern of sockeye salmon into Upper Cook Inlet, Alaska, 1992, estimated from daily CPUE measured at the latitude of Anchor Point.

| Day | Date | Input Y | Estimated Y |
|-----|------|------------|----------------|
| 9 | 702 | .0057 | .0315 |
| 10 | 703 | .0080 | .0391 |
| 11 | 704 | .0192 | .0484 |
| 12 | 705 | .0363 | .0599 |
| 13 | 706 | .0461 | .0737 |
| 14 | 707 | .0472 | .0905 |
| 15 | 708 | .0649 | .1107 |
| 16 | 709 | .1013 | .1347 |
| 17 | 710 | .1386 | .1629 |
| 18 | 711 | .1536 | .1958 |
| 19 | 712 | .1780 | .2334 |
| 20 | 713 | .2806 | .2757 |
| 21 | 714 | .3006 | .3225 |
| 22 | 715 | .4085 | .3731 |
| 23 | 716 | .4391 | .4267 |
| 24 | 717 | .5990 | .4821 |
| 25 | 718 | .6182 | .5379 |
| 26 | 719 | .6474 | .5928 |
| 27 | 720 | .6944 | .6454 |
| 28 | 721 | .7155 | .6948 |
| 29 | 722 | .7339 | .7400 |
| 30 | 723 | .7521 | .7807 |
| 31 | 724 | .7594 | .8165 |
| 32 | 725 | .7754 | .8477 |
| 33 | 726 | .8059 | .8744 |
| 34 | 727 | .8231 | .8969 |
| 35 | 728 | .8508 | .9158 |
| 36 | 729 | .8983 | .9315 |
| 37 | 730 | .9244 | .9445 |

Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 1992 offshore test fish project.

| Date | Station | Air Temp. (c) | Water Temp. (c) | Wind Vel. (knots) | Wind Dir^ | Tide Stage~ | Salinity (ppt) | Water Depth (f) | Secchi (m) |
|--------|---------|---------------|-----------------|-------------------|-----------|-------------|----------------|-----------------|------------|
| 01-Jul | 4 | 14 | 11 | 3 | 1 | 3 | 30 | 22.5 | 5 |
| | 5 | 14 | 10 | 2 | 1 | 3 | 30 | 37 | 3 |
| | 6 | 15 | 11 | 2 | 1 | 4 | 30 | 44.5 | 2 |
| | 6.5 | 15 | 10 | 0 | 0 | 4 | 29 | 44 | 2 |
| | 7 | 11 | 10.5 | 1 | 1 | 4 | 29 | 45 | 1.5 |
| | 8 | 13 | 11 | 0 | 0 | 4 | 29 | 30 | 2 |
| | 8 | 9 | 10 | 10 | 5 | 3 | 30 | 31 | 2.5 |
| | 7 | 10 | 10 | 10 | 4 | 3 | 30 | 43 | 2.5 |
| 02-Jul | 6 | 10 | 10 | 12 | 4 | 3 | 30 | 43.5 | 3.5 |
| | 5 | 10 | 10 | 12 | 4 | 3 | 31 | 39 | 3.5 |
| | 4 | 10 | 10 | 8 | 4 | 3 | 31 | 23 | 6.5 |
| | 4 | 14 | 10 | 0 | 0 | 3 | 31 | 25.5 | 5 |
| | 5 | 15 | 11 | 4 | 4 | 3 | 31 | 47 | 6.5 |
| 03-Jul | 6 | 15 | 11 | 0 | 0 | 3 | 31 | 46.5 | 3.5 |
| | 6.5 | 14 | 11 | 0 | 0 | 4 | 30 | 43 | 1.5 |
| | 7 | 14 | 11 | 2 | 4 | 4 | 31 | 43 | 1.5 |
| | 8 | 14 | 11 | 0 | 0 | 4 | 29 | 29.5 | 1.3 |
| | 8 | 10 | 10 | 8 | 4 | 3 | 31 | 26.5 | 1.7 |
| | 7 | 11 | 11 | 6 | 4 | 3 | 30 | 51 | 3 |
| 04-Jul | 6 | 12 | 10 | 4 | 5 | 3 | 30 | 45.5 | 4.5 |
| | 5 | 11 | 10 | 3 | 5 | 3 | 30 | 36 | 4.5 |
| | 4 | 13 | 10 | 4 | 6 | 3 | 32 | 23.5 | 9.5 |
| | 4 | 10 | 10 | 6 | 4 | 1 | 33 | 27 | 9 |
| | 5 | 9 | 10 | 5 | 4 | 3 | 31 | 37 | 6 |
| 05-Jul | 6 | 9 | 10 | 7 | 5 | 3 | 30 | 47 | 3 |
| | 6.5 | 10 | 11 | 3 | 5 | 3 | 29 | 45 | 2 |
| | 7 | 11 | 9 | 9 | 4 | 3 | 31 | 43 | 2 |
| | 8 | 12 | 10 | 8 | 4 | 3 | 29 | 31 | 1.5 |
| | 8 | 9 | 11 | 0 | 0 | 4 | 29 | 30 | 1.5 |
| | 7 | 10 | 10 | 0 | 0 | 4 | 29 | 46.5 | 3 |
| 06-Jul | 6 | 11 | 10 | 0 | 0 | 1 | 30 | 48.5 | 3 |
| | 5 | 10 | 10 | 0 | 0 | 3 | 30 | 38 | 6 |
| | 4 | 10 | 10 | 0 | 0 | 3 | 30 | 26 | 9 |
| | 4 | 10 | 10 | 0 | 0 | 4 | 30 | 27 | 8 |
| | 5 | 10 | 10 | 0 | 0 | 1 | 30 | 37 | 6 |
| 07-Jul | 6 | 11 | 11 | 0 | 0 | 3 | 29 | 46.5 | 3.5 |
| | 6.5 | 13 | 11 | 0 | 0 | 3 | 29 | 42 | 2 |
| | 7 | 13 | 10 | 0 | 0 | 3 | 29 | 44.5 | 2.5 |
| | 8 | 15 | 10.5 | 0 | 0 | 2 | 29 | 29 | 2.5 |

-continued-

Appendix F.1. (p 2 of 4)

| Date | Station | Air Temp. (c) | Water Temp. (c) | Wind Vel. (knots) | Wind Dir^ | Tide Stage- | Salinity (ppt) | Water Depth (f) | Secchi (m) |
|--------|---------|---------------|-----------------|-------------------|-----------|-------------|----------------|-----------------|------------|
| 08-Jul | 8 | 10 | 11 | 12 | 2 | 4 | 29 | 29 | 1.5 |
| | 7 | 10 | 11 | 12 | 2 | 4 | 28 | 44.7 | 2.5 |
| | 6 | 10 | 11 | 12 | 2 | 4 | 29 | 46.5 | 2.5 |
| | 5 | 10 | 10 | 12 | 2 | 4 | 31 | 45.5 | 4 |
| | 4 | 10 | 10 | 15 | 2 | 4 | 31 | 26.5 | 7 |
| 09-Jul | 4 | 11 | 10 | 4 | 8 | 4 | 30 | 25.5 | 7 |
| | 5 | 11 | 10 | 4 | 1 | 4 | 31 | 47 | 6 |
| | 6 | 13 | 10 | 0 | 0 | 1 | 30 | 49 | 5 |
| | 6.5 | 14 | 10 | 2 | 2 | 3 | 30 | 46 | 5 |
| | 7 | 14 | 11 | 0 | 0 | 3 | 29 | 44 | 2.5 |
| 10-Jul | 8 | 14 | 11 | 0 | 0 | 3 | 29 | 28 | 2.5 |
| | 8 | 10 | 9 | 0 | 0 | 3 | 30 | 30 | 2.5 |
| | 7 | 10 | 11.5 | 0 | 0 | 3 | 28 | 43 | 2.5 |
| | 6 | 11 | 13 | 5 | 8 | 3 | 27 | 46 | 2 |
| | 5 | 11 | 11 | 4 | 8 | 2 | 29 | 36 | 3 |
| 11-Jul | 4 | 10 | 11 | 6 | 1 | 4 | 30 | 25 | 8 |
| | 4 | 11 | 12 | 0 | 0 | 4 | 26 | 26 | 7 |
| | 5 | 11 | 11 | 3 | 1 | 4 | 29 | 37 | 5 |
| | 6 | 13 | 12 | 3 | 1 | 4 | 29 | 47.5 | 3 |
| | 6.5 | 13 | 12 | 3 | 1 | 4 | 29 | 43 | 3 |
| 12-Jul | 7 | 14 | 13 | 0 | 0 | 4 | 27 | 46 | 2 |
| | 8 | 14 | 13 | 4 | 6 | 1 | 27 | 30 | 2.5 |
| | 8 | 11 | 14 | 0 | 0 | 3 | 26 | 31 | 2.5 |
| | 7 | 12 | 13 | 5 | 5 | 3 | 27 | 44 | 3 |
| | 6 | 12 | 13 | 5 | 4 | 3 | 27 | 48 | 3 |
| 13-Jul | 5 | 13 | 13 | 6 | 4 | 3 | 28 | 37 | 3 |
| | 4 | 10 | 12 | 8 | 4 | 3 | 29 | 24 | 6 |
| | 4 | 12 | 12 | 12 | 4 | 3 | 27 | 25 | 6 |
| | 5 | 12 | 12 | 15 | 4 | 2 | 29 | 41 | 3 |
| | 6 | 13 | 12.5 | 13 | 4 | 4 | 28 | 44 | 2.5 |
| 14-Jul | 6.5 | 13 | 14 | 20 | 4 | 4 | 27 | 46 | 2.5 |
| | 7 | 11 | 14 | 12 | 4 | 4 | 27.5 | 44 | 3 |
| | 8 | 13 | 13 | 15 | 5 | 4 | 28 | 32 | 3 |
| | 8 | 10 | 13 | 5 | 4 | 1 | 27 | 33 | 2 |
| | 7 | 10 | 14 | 9 | 4 | 3 | 26 | 45 | 2.5 |
| 15-Jul | 6 | 10 | 14 | 7 | 5 | 3 | 27 | 47 | 3 |
| | 5 | 10 | 13 | 7 | 5 | 3 | 27 | 41 | 3 |
| | 4 | 12 | 13 | 4 | 5 | 3 | 28 | 22 | 3 |
| | 4 | 11 | 11 | 0 | 0 | 3 | 29 | 23 | 6 |
| | 5 | 13 | 11 | 8 | 5 | 3 | 29 | 38 | 4 |
| | 6 | 12 | 10 | 0 | 0 | 4 | 30 | 47 | 3 |

-continued-

Appendix F.1. (p 3 of 4)

| Date | Station | Air | Water | Wind | | | Water | |
|--------|---------|--------------|--------------|-----------------|--------------------------|----------------|-------------------|--------------|
| | | Temp. (c) | Temp. (c) | Vel. (knots) | Wind Dir ^a | Tide Stage- | Salinity (ppt) | Depth (f) |
| 15-Jul | 6.5 | 13 | 11 | 3 | 8 | 4 | 29 | 41 |
| | 7 | 15 | 10 | 0 | 0 | 4 | 30 | 46 |
| | 8 | 14 | 11 | 0 | 0 | 4 | 29 | 34 |
| 16-Jul | 8 | 10 | 10 | 7 | 4 | 1 | 29 | 30 |
| | 7 | 11 | 11 | 9 | 4 | 3 | 29 | 46 |
| | 6 | 11 | 11 | 7 | 4 | 3 | 30 | 48 |
| | 5 | 14 | 10 | 7 | 5 | 3 | 30 | 40 |
| | 4 | 11 | 10 | 7 | 5 | 3 | 30 | 55 |
| 17-Jul | 4 | 11 | 9 | 0 | 0 | 3 | 29 | 28 |
| | 5 | 14 | 11 | 3 | 4 | 3 | 27 | 38 |
| | 6 | 14 | 12 | 0 | 0 | 4 | 26 | 46 |
| | 6.5 | 13 | 12 | 3 | 4 | 4 | 27 | 46 |
| | 7 | 13 | 12 | 5 | 5 | 4 | 27 | 47 |
| 18-Jul | 8 | 12 | 11 | 6 | 6 | 4 | 27 | 28 |
| | 8 | 12 | 11 | 3 | 5 | 4 | 28 | 32 |
| | 7 | 11 | 11 | 5 | 5 | 1 | 28 | 43 |
| | 6 | 11 | 11 | 5 | 5 | 3 | 28 | 46 |
| | 5 | 12 | 11 | 5 | 5 | 3 | 29 | 37 |
| 19-Jul | 4 | 13 | 10 | 0 | 0 | 0 | 30 | 24 |
| | 4 | 14 | 10 | 0 | 0 | 3 | 28 | 25 |
| | 5 | 13 | 11 | 0 | 0 | 3 | 28 | 37 |
| | 6 | 14 | 10 | 3 | 6 | 4 | 28 | 49 |
| | 6.5 | 15 | 11 | 0 | 0 | 4 | 29 | 43 |
| 20-Jul | 7 | 18 | 11 | 3 | 4 | 4 | 29 | 46 |
| | 8 | 16 | 11 | 3 | 4 | 4 | 28 | 34 |
| | 8 | 13 | 11 | 10 | 4 | 4 | 28 | 30 |
| | 7 | 13 | 11 | 12 | 4 | 1 | 28 | 46 |
| | 6 | 12 | 11 | 20 | 4 | 3 | 29 | 48 |
| 21-Jul | 5 | 14 | 11 | 25 | 4 | 3 | 29 | 39 |
| | 4 | 10 | 10 | 5 | 2 | 3 | 28 | 25 |
| | 5 | 10 | 12 | 6 | 1 | 3 | 27 | 36 |
| | 6 | 11 | 12 | 7 | 1 | 3 | 27 | 46 |
| | 6.5 | 11 | 12 | 8 | 1 | 3 | 27 | 45 |
| 22-Jul | 7 | 11 | 12 | 10 | 1 | 2 | 27 | 39 |
| | 8 | 10 | 12 | 17 | 1 | 4 | 28 | 30 |
| | 7 | 10 | 11 | 10 | 1 | 4 | 28 | 44 |
| | 6 | 10 | 10 | 20 | 1 | 1 | 28 | 46 |
| | 5 | 10 | 10 | 25 | 1 | 3 | 29 | 38 |
| 23-Jul | 4 | 13 | 10 | 8 | 1 | 4 | 29 | 25 |
| | 5 | 13 | 10 | 8 | 1 | 1 | 29 | 39 |
| | 6 | 13 | 10 | 11 | 1 | 3 | 29 | 48 |

-continued-

Appendix F.1. (p 4 of 4)

| Date | Station | Air | Water | Wind | | | Water | | |
|--------|---------|-----------|-----------|--------------|-----------|-------------|----------------|-----------|------------|
| | | Temp. (c) | Temp. (c) | Vel. (knots) | Wind Dir^ | Tide Stage~ | Salinity (ppt) | Depth (f) | Secchi (m) |
| 23-Jul | 6.5 | 13 | 12 | 8 | 1 | 3 | 26.5 | 42 | 3 |
| | 7 | 15 | 12 | 8 | 2 | 3 | 26 | 46 | 2.5 |
| | 8 | 15 | 12 | 10 | 2 | 3 | 26 | 32 | 3 |
| 24-Jul | 8 | 13 | 12 | 6 | 8 | 4 | 25 | 29 | 3 |
| | 7 | 15 | 12 | 7 | 1 | 4 | 26 | 45 | 3.5 |
| | 6 | 14 | 11 | 8 | 1 | 4 | 27.5 | 46 | 9 |
| | 5 | 13 | 10 | 7 | 1 | 4 | 28.5 | 37 | 9 |
| | 4 | 15 | 10 | 6 | 1 | 4 | 29 | 25.5 | 9 |
| 25-Jul | 4 | 13 | 11 | 0 | 0 | 4 | 28 | 26 | 7 |
| | 5 | 12 | 10.5 | 5 | 6 | 4 | 28 | 37 | 9 |
| | 6 | 13 | 11 | 5 | 6 | 4 | 28 | 51 | 8 |
| | 6.5 | 14 | 13 | 10 | 6 | 4 | 26 | 46 | 3.5 |
| | 7 | 13 | 12 | 10 | 6 | 1 | 25 | 42 | 3.5 |
| | 8 | 13 | 12 | 10 | 6 | 3 | 25 | 31 | 4 |
| 26-Jul | 8 | 13 | 13 | 0 | 0 | 3 | 24 | 30 | 3 |
| | 7 | 13 | 13 | 3 | 1 | 3 | 24.5 | 41 | 3.5 |
| | 6 | 13 | 13 | 5 | 2 | 3 | 24 | 48 | 3.5 |
| | 5 | 13 | 10 | 0 | 0 | 2 | 28 | 43 | 7 |
| | 4 | 14 | 10 | 5 | 2 | 4 | 29 | 25 | 12 |
| 27-Jul | 4 | 11 | 10 | 0 | 0 | 4 | 28 | 25 | 9 |
| | 5 | 11 | 11 | 0 | 0 | 4 | 27 | 39 | 6 |
| | 6 | 13 | 11 | 2 | 1 | 4 | 29 | 49 | 6 |
| | 6.5 | 15 | 14 | 0 | 0 | 4 | 23 | 49 | 3 |
| | 7 | 15 | 13 | 5 | 8 | 4 | 24 | 45 | 3 |
| | 8 | 15 | 13 | 5 | 8 | 1 | 25 | 33 | 2.5 |
| 28-Jul | 8 | 10 | 12 | 3 | 2 | 3 | 27 | 3 | 3 |
| | 7 | 11 | 11 | 5 | 8 | 3 | 26 | 44 | 3 |
| | 6 | 10 | 11 | 6 | 8 | 3 | 27 | 44 | 4 |
| | 5 | 10 | 10 | 7 | 8 | 2 | 28 | 36 | 6 |
| | 4 | 10 | 10 | 15 | 8 | 4 | 30 | 24 | 7 |
| 29-Jul | 4 | 10 | 10 | 0 | 0 | 2 | 29 | 23 | 6.5 |
| | 5 | 10 | 10 | 0 | 0 | 4 | 28 | 38 | 6 |
| | 6 | 13 | 10 | 0 | 0 | 4 | 28 | 46 | 4.5 |
| | 6.5 | 13 | 10 | 5 | 8 | 4 | 29 | 45 | 5.5 |
| | 7 | 12 | 11 | 7 | 8 | 4 | 26 | 43 | 2.5 |
| | 8 | 13 | 11 | 7 | 8 | 4 | 28 | 32 | 3 |
| 30-Jul | 8 | 10 | 11 | 0 | 0 | 4 | 26.5 | 34 | 3 |
| | 7 | 10 | 11 | 5 | 4 | 1 | 27 | 46 | 4 |
| | 6 | 10 | 11 | 7 | 4 | 3 | 27.5 | 44 | 6 |
| | 5 | 9 | 10 | 7 | 4 | 3 | 29 | 38 | 8 |
| | 4 | 10 | 10 | 10 | 4 | 3 | 29 | 24 | 8 |

^ Wind direction code 1=north, 2=northeast, 3=east, 4=southeast,
5=south, 6=southwest, 7=west, 8=northwest

~ Tide stage code 1=high, 2=low, 3=ebb, 4=flood

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